Asian Economic and Financial Review
ISSN(e): 2222-6737
ISSN(p): 2305-2147
DOI: 10.18488/journal.aefr.2017.712.1242.1255
Vol. 7, No. 12, 1242-1255

URL: www.aessweb.com

MEASURING THE IMPACT OF POPULATION HEALTH AND EDUCATION ON FOREIGN DIRECT INVESTMENT: PANEL EVIDENCE FROM 46 COUNTRIES

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Article History
Received: 11 September 2017
Revised: 20 October 2017
Accepted: 25 October 2017
Published: 30 October 2017

Keywords
Population health
Education,
FDI, developing countries, panel data, life expectancy.

ABSTRACT

This study exploresthe impact of population health and education on inflows of foreign direct investment (FDI) by conducting a panel data analysis of 46 developing countries over the period 1996–2011. We found that that gross inflows of FDI are strongly influenced by population health in developing countries. The result suggests that improving life expectancy by one year increases gross FDI inflows by about 7%. alternative specifications of this panel model also support this view.Also, the estimated model does not bring about any significant relation between education level and FDI in developing countries. The findings are consistent with the hypothesis that population health is an important ohuman capital instrument for developing countries and improved population health is likely to attract higher FDI inflow.

Contribution/ Originality: This study contributes in the existing literature through adding education level in the analysis of population health and its impact on attracting foreign direct investment (FDI). Also the analysis provided new dimensions for these 46 developing countries in terms of population health, education and FDI.

1. INTRODUCTION

Developing countries around the world are more or less dependent on foreign investment for boosting their economic growth. Human capital is a significant factor for investment in all sectors of an economy. In the developing world, there is need of investment and unused human capital and lucrative resources are what foreign investors could use. This is why, foreign investment, basically foreign direct investment or FDI[1] has become a popular policy choice for a solution to tackle unemployment, lack of capital and technology which hold back investment in developing countries. Companies buy business entities and assets overseas in order to use their assets

[1]Foreign direct investment reflects the objective of obtaining a lasting interest by a resident entity in one economy ("direct investor") in an entity resident in an economy other than that of the investor ("direct investment enterprise"). The lasting interest implies the existence of a long-term relationship between the direct investor and the enterprise and a significant degree of influence on the management 7 of the enterprise. Direct investment involves both the initial transaction between the two entities and all subsequent capital transactions between them and among affiliated enterprises, both incorporated and unincorporated. OECD (1996).

and take advantage of various cheaper resources that the countries of interest are abundant in.[2] Pools of cheap labor, unused natural resources and less restrictive on business environment of foreign government are the main attractions for FDI.

Besides the above factors, over the year's human capitals like education and population health have become more important for FDI. The World Health Organization's Report titled 'Macroeconomics and Health: Investing in Health for Economic Development' (Commission on Macroeconomics and Health (CMH), 2001)[3] asserts: 'Healthier workers are physically and mentally more energetic and robust, more productive, and earn higher wages. Their productivity makes companies more profitable, and a healthy workforce is important when attracting foreign direct investment (FDI).' An expanding body of researches has shown that health is a fundamental component of human capital that raises worker productivity. Countries with higher levels of human capital are likely to attract more foreign investors.

On the other hand, a large burden of infectious diseases, loss of workers due to morbidity and mortality might also dampen FDI inflows to a given developing country that is prone to such problems. Similarly, if average education level of workers is high, then it will cost a foreign firm a lot less when it comes to imparting training to the workers. Moreover, if educated managers can be recruited from the same locale, then firms will be benefitted in terms of cost and efficiency.

More recently, a few works have been undertaken to focus on the human capital that carries for FDI but the role of population health is largely untouched. To investigate whether health status of a population with education level affects FDI inflows, we conduct a panel data analysis of 46 developing countries over the period 1996–2011. These findings are coherent with the view that health is a fundamental; part of human capital for developing countries and thus help attract FDI.

2. INLFUENCE OF FDI ON HUMAN CAPITAL

FDI has become an increasingly important source of financing for businesses other than indirect portfolio investment worldwide. In the last two decades, global FDI inflows have increased from $59 billion in 1982 to $651 billion in 2002 (UNCTAD, 2003)[4]. Attracting FDI is more important to developing countries given their lower rate of savings and income levels. Also, FDI has other characteristics of particular relevance for developing economies around the world. These include increasing access of domestic firms to international markets and facilitating the transfer of modern technology (Miyamoto, 2003). FDI geared to knowledge and skill-intensive industries might imply that countries with increasing levels of human capital are preferred destination to investors (Blomstrom and Kokko, 2003). FDI also contribute to expand government tax base for the host economy and enhance technological spillover across industries (Loungani and Razin, 2001).

Standard neoclassical assumption states that, where output is produced by capital and labor, capital is considered to flow from rich to poor countries until capital–labor ratios match across different countries. The observed trend of FDI, with most capital flowing from one rich country to another, is thus an apparent paradox (Alsan *et al*., 2006). Lucas (1990) provided a theoretical explanation to this paradoxical pattern putting human capital as a factor in the analysis.

Physical capital and skills are mostly complementary inputs; the increasing presence of a healthy and highly educated workforce can increase the productivity of capital in many ways. This is driven in part by economic activity shifting first from the primary goods to manufacturing sectors and then toward services, which are successively more knowledge intensive.

[2] Firms become multinational in order to exploit intangible assets of the firm overseas as well as at home Grubaugh (1987).

[3] WHO (2001).

[4] Smith (2004). Elsevier (2004).

For example, in the early 1970s, the typical services sector accounted for a mere 25% of the world FDI stock. By 2002, services had risen to about 60% of the total stock. FDI geared to knowledge and skill-intensive industries might indicate that countries with higher levels of human capital are more attractive to foreign investors (Miyamoto, 2003).

FDI inflows are not necessarily distributed evenly. Industrialized economies are the most likely the common destination for FDI; But some developing countries receive much greater FDI inflows than others. African countries in particular have struggled to attract foreign investors than Latin American and East European countries. Asideu (2002) found that sub-Saharan African (SSA) countries were less likely to attract foreign investors than countries in other regions, despite the well-known fact that US investment into SSA had enjoyed a higher rate of return than investment in other developing countries . Furthermore, factors proven to promote FDI to non-SSA countries (such as transport infrastructure and return on capital investment) did not have a clear effect on FDI to these SSA countries. Therefore, we may point at the education level and workers' health as unexplained determinants of FDI, for the lack of which sub-Saharan countries keep failing to attract FDI.

On the other hand, health has a direct impact on the productivity of workers. Healthy workers are generally more physically and mentally able than those afflicted with disease or disability. Furthermore, these workers are less likely to be absent from workplace, or suffer poor productivity in work, due to personal illness and other health issues. Poor health can also lead to low wages, which in turn keeps health and nutrition levels of workers low, thereby creating a poverty trap (Alsan *et al*., 2006).

Health, viewed as a form of human capital, could affect FDI through several mechanisms. A healthy workforce enhances worker productivity and thereby attract FDI inflows. However, health may also encourage FDI via other mechanisms. Firm profitability is at risk if health-related costs are high. Alsan *et al*. (2006) outlined the indirect impact of health as human capital on FDI.

Most studies investigating this idea recognize human capital barely with education, ignoring reasons for considering health as an fundamental instrument of human capital. We investigate whether the health status of the population along with education encourages inflows of FDI.

3. THE MODEL

Firms invest in foreign countries, instead of exporting or licensing to a local company, for several advantages. Shatz and Venables (2000) note that foreign investor may seek to better serve the local market, producing locally to avoid transportation costs, trade barriers, or production delays and to speed information flow. This is considered as market-seeking or horizontal FDI. Alternatively, these investors might produce for the global market but select this location to minimize production costs through available local lower-cost inputs. This is considered export-oriented or vertical FDI. In theory, health can affect both vertical and horizontal FDI.

Local production normally allows a firm to avoid unnecessary transportation costs and government import duties; but this is attractive if the domestic market is sufficiently large enough to cover the fixed costs of setting up production and any country-specific cost disadvantages. Asideu (2002) suggested that horizontal FDI will be driven largely by domestic demand (market size). Moreover, host market size, usually measured in terms of real gross domestic product (GDP) per capita and population size, is a positive determinant of FDI inflows. By contrast, ceteris paribus, vertical FDI will flow to countries those have available cheap, productive inputs and have fewest restrictions on trade. Additionally, the presence of highly educated, low-wage healthy workforce, may be a large inducement for vertical FDI.

Role of education level is more often visualized by researchers. There are several ways in which education level can affect FDI. We have already learned about the benefit comes from higher average education level of workers. Empirically there are more examples of population education level and FDI. Higher education level creates demand for hi-tech and expensive products. In South East Asia, companies like Asus, Samsung, Dell, Transcend, etc. have

invested to produce the computer products locally. The South East Asian production of computer appliances are now serving markets in most parts of East Africa, Middle East and South Asia. Education level of population supplied managers, workers - though of small numbers in highly capital-intensive computer product industries – to the industries and the average education level causes the population demand hi-tech products that come cheaper. In comparison with South Asia & Middle East, education level in South East Asia is much higher. This indicates education level serves as an intrinsic factor to FDI inflows to manufacturing.

Apart from the example of South East Asia, we can extend our understanding of role of education level by splitting the educational degrees into major parts and population corresponding to those. For example, in Bangladesh, the major portion of literate people has only completed primary level. A smaller portion completed secondary level and a portion smaller than that took higher degrees. Therefore, it is very likely that the foreign investors would invest in products that require workers' education of primary level or none and consumed by people of the same education levels. This is a generalization, because there are many RMG factories that are set only to export to developed markets. But it is also true that many foreign companies that produce food and cosmetics are using local labor and aiming the local market. It is also true that a foreign firm may produce locally using local workers of lower education level and serves a market of consumers of higher education level (for example a foreign upscale fashion chain may set up local outlet aiming a market of high-income cohort of the country). The converse may also be true.

But for the simplicity of our analysis, we are assuming that the local market and local labor force have a uniform education level, though we will test the model with three education levels. The education levels we have included are gross tertiary enrolment ratio, gross secondary enrolment ratio and rate of primary completion. Better measurements would be rate of completion of tertiary and secondary levels. But we do not have these measures at hand.

We used 'life expectancy at birth' as proxy for the health of a country's entire population. However, Murray *et al.* (2000) showed that higher life expectancy is linked to lower morbidity and overall better health stature. However, health is a multidimensional concept and it is likely that our life expectancy measure does not capture the full complexity of population health but apparently, a significant portion of it.

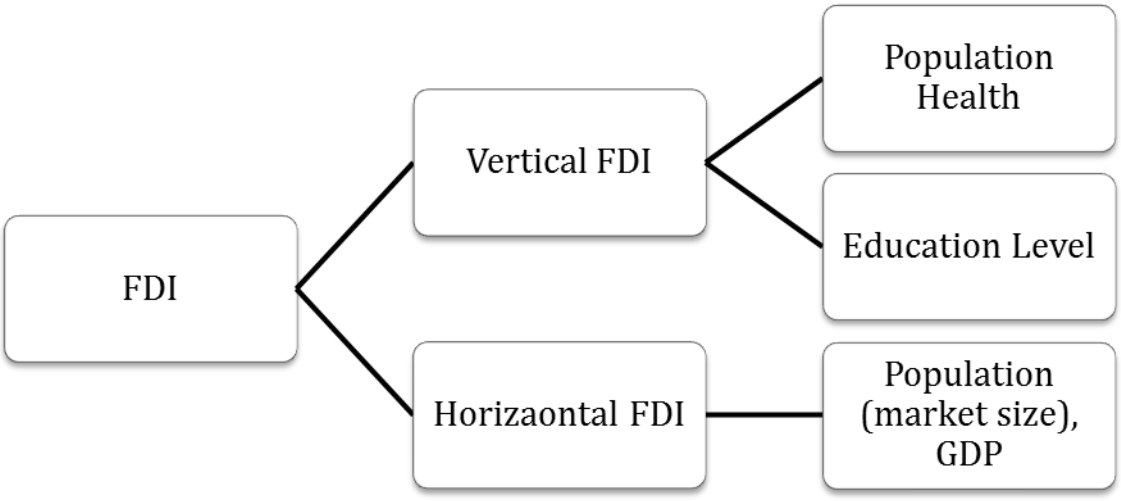

Figure-1. FDI and its observed determinants

Source: Author

Alsan *et al.* (2006) used a model to show the relation between population health and education level. They incorporated population and GDP or national income as 'absorptive capacity of FDI'. Besides their notion of GDP and population, we have to explain FDI with GDP and population because these two factors are controlling other

variables (health, education, etc.) in the model. We do not want our model have serially correlated residuals due to endogenous factors like GDP and population. Verily, they represent the absorptive capacity of a country.

We also include several more variables such as openness, corruption control, government effectiveness, fixed telephone lines per 100 people (denoting local and international electronic interconnectivity), energy production and openness along with health and education level. Trade openness of the economy is especially significant for firms seeking to export products from the home country to the global market, as tariffs, quotas, and other forms of capital controls will diminish firms' profits (Asideu, 2004). Good infrastructure in the form of well-managed transportation and state-of-the-art communication network can increase firm productivity and help attract foreign direct investment. To analyze infrastructure impacts on foreign direct investment, Alsan *et al.* (2006) employed telephone mainlines per 1,000 population as proxy for host country infrastructure.

Cheaper energy means lower average variable cost in manufacturing for foreign investors. On the other hand, government's ability to assist the foreign investment on administrative level is necessarily important. We also assume that political turmoil in developing courtiers is likely to deter investment. It is the government's duty to absorb the bad effects of politics and save foreign investments from any such threats. This is a very strong assumption as much as it is a very complicated task for governments. But some governments in developing countries showed the ability to "absorb" the political shocks to secure foreign investment. Governments of Egypt, Mexico, Thailand and India affirm this assumption. On the other hand, government of Bangladesh seemed less able to "absorb" the political shocks for foreign investment.

Addressing FDI determinants, Alsan *et al.* (2006) wrongly assumed that GDP will be negatively related to FDI because, in their words, 'The level of GDP per capita is also a proxy for the general level of input prices. We can control this by including the level of income per capita in the regression. In the framework, countries with a high level of income per capita are likely to have high factor prices which will deter foreign investment.' This may be a case of developed countries but not one of developing countries. Because in developing world, higher GDP does not mean higher input price, because the "abundant" inputs are likely to be cheaper, for which the investors would consider investment in the first place. Moreover, higher GDP means that a developing country has thriving sectors and also high probable return from investment. For example, the higher GDP per capita does not scare the foreign investors in China. Therefore, to denote the 'thrive' (as well as 'absorptive capacity') of the economy we use log transformation of GDP per capita or growth rate of GDP per capita.

To simplify, variables like corruption control, government effectiveness, fixed telephone lines, energy production and openness are important in terms of trade barriers, fixed and variable costs for foreign firms that they always take into account before making investment decisions.

There are many other factors other than these that are related to FDI and health, education, and other variables which will cause problem of serial correlation. Though we can account for relations with those factors but it is not possible to incorporate them into the model due to insufficiency of cross-country data.

3.1. Econometric Specification

In our empirical work, we model the gross level of FDI inflows at time t in country i as follows:

$$\ln\_FDI_{it} = \alpha_1 + \alpha_2 D_{2i} + \alpha_3 D_{3i} + \ldots + \alpha_{46} D_{46i} + \beta_{1i} \ln\_gdp_{it} + \beta_{2i} \ln\_pop_{it} + \beta_{3i} \ln\_life_{ij} + \beta_{4i} priedu_{it} + \beta_{5i} secedu_{it} + \beta_{6i} teredu_{ij} + \beta_{7i} \ln\_tele_{ij} + \beta_{8i} \ln\_energyp_{it} + \beta_{9i} openness_{it} + \beta_{10i} government\sim s_{ij} + \beta_{11i} corruption\sim l_{ij} + u_{it} \quad (1)$$

$$\ln\_FDI_{it} = \alpha_1 + \beta_{1i} \ln\_gdp_{it} + \beta_{2i} \ln\_pop_{it} + \beta_{3i} \ln\_life_{ij} + \beta_{4i} priedu_{it} + \beta_{5i} secedu_{it} + \beta_{6i} teredu_{ij} + \beta_{7i} \ln\_tele_{ij} + \beta_{8i} \ln\_energyp_{it} + \beta_{9i} openness_{it} + \beta_{10i} government\sim s_{ij} + \beta_{11i} corruption\sim l_{ij} + u_{it} + a_{it} \quad (2)$$

Equation 1 represents the fixed-effects model and Equation 2 represents the individual effects model.

Table-1. Variable definitions and sources

Variables	Definitions
$\ln\_FDI_{it}$	Log value of FDI inflow to country i at time t
α_1	Constant/ intercept term
$\alpha_2 D_{2i} + \alpha_3 D_{3i} + \ldots + \alpha_{46} D_{46i}$	D_i are country dummies and αs are their associated coefficients in fixed-effects model
$\ln\_gdp_{it}$	Log value of GDP per capita of country i at time t
$\ln\_pop_{it}$	Log value of population of country i at time t
$\ln\_life_{ij}$	Log value of life expectancy of people of country i at time t
$priedu_{it}$	Rate of primary education completion in country i at time t
$secedu_{it}$	Gross secondary education enrolment ratio in country i at time t
$teredu_{ij}$	Gross tertiary education enrolment ratio in country i at time t
$\ln\_tele_{ij}$	Number of fixed telephone lines in country i at time t
$\ln\_energyp_{it}$	Energy production of country i at time t
$openness_{it}$	$\frac{Export+Import}{GDP}$ % of country i at time t
government~s	Government effectiveness index of country i at time t
$corruption\sim l_{ij}$	Corruption Control index of country i at time t
u_{it}	Error term
a_{it}	Individual random effects of Random-effects model

The full account of the data of the variables is given in Appendix I. We used 4 alternative specifications of the given models. Equation 1 & 2 have the full specification that we would use which is preceded by alternative specifications that includes our variables of interest; population health and education level. All four specifications contain population, GDP per capita, openness, governance indicators as they are found to be sole determinants of FDI in many studies. This is a log-linear model. The econometric equation is presented in a fixed-effects form of panel data regression. We run several tests to check for problems with the model and used the form that efficiently estimates the model. Findings of the tests will be described in the section V.

4. DATA

The empirical analysis employs panel data for a set of 46 developing countries observed over 16 years from 1996 to 2011. A list of countries included in the analysis is provided in Appendix II. We use all countries for which data of listed variables are available for the given time period, but exclude major petroleum exporter countries, because for these countries our measure of trade openness may not reflect the lack of trade barriers. We have taken FDI data from the World Bank (2012). All explanatory variables are taken at the beginning of the relevant time-period. Data of Government Effectiveness and Corruption Control is collected from the World Bank *World Governance Indicators (WGI) online dataset.* The correlation coefficients for the full sample of 46 countries are presented in Appendix III.

Table-2. Summary of Regression Results

Variable	Observations	Means	Std. Dev.	Min	Max
ln FDI	727	20.35554	2.070306	12.52855	26.21922
ln GDP (per capita)	736	7.315511	1.167618	4.723107	9.639827
ln Population	736	16.80363	1.398924	13.49942	21.01901
Secondary Education (%)	579	60.60362	27.47117	5.15948	110.0316
Primary Education (%)	514	78.52634	24.13019	14.0266	115.6613
Tertiary Education (%)	503	19.89396	16.2179	.29752 66	.35328
ln Life Expectancy	726	4.169193	.1536642	3.802024	4.373428
ln Energy Production	604	9.298187	1.93946	5.544759	14.60803
Openness	725	71.94121	32.2911	0	211.338
Govt. Effectiveness (Index)	553	-0.3183725	_	-2.5	+2.5
Corruption Control (Index)	585	-0.1945128	_	-2.5	+2.5
Fixed Telephone lines	736	1.463493	1.571486	-2.002122	3.616291

5. ANALYSIS

We run Hausman test and reject null hypothesis that Random effects model provides consistent estimates. The Hausman test provided us with a nice side-by-side comparison, illustrated in Appendix IV. For the coefficient for regressor log of population, a test of Random effects against Fixed-effects yields $t = 274.3699 / 60.68422 = 4.52$, a highly statistically significant difference. And the overall statistic, here $\chi^2(9) = 64.21$, has $p = 0.000$.

The Modified Wald test for group-wise heteroskedasticity reveals that our dataset has the problem of heteroskedasticity. With the overall statistic $\chi^2(41) = 150.2$, $p = 0.000$, we reject null hypothesis of homoskedasticity or constant variances. Wooldridge test for serial correlation shows that there is no first order serial correlation. With the statistic, F (1, 30) = 4.338, Prob>F = 0.0459, we reject null hypothesis of serial correlation. Both test results are exhibited in Appendix V.

Table 2 reports our panel data estimates for the full sample of 46 countries for the period 1996 to 2011. We estimate using heteroskedasticity-consistent robust standard errors.

Column 1 of Table 2 reports results for and OLS fixed-effect specification that is representative of our model. The coefficients on GDP per capita and total population are positive and strongly significant; that is our specification of the variables is true. The full regression estimates in column 1 to 4 are illustrated in Appendix VI. All four model estimates are jointly significant given their F values. The values of correlation coefficients are 33%, 35%, 44% and 54% for regressions in column 1, 2, 3 & 4 respectively.

Corruption control and the other governance measure, government effectiveness is not significantly different from zero in our specifications. Adding life expectancy in column 2 shows that health is a statistically significant indicator of gross FDI inflows at 5% level and adding 3 education levels in column 3 leaves the life expectancy still significant at 5% level. The results demonstrate that every additional year of life expectancy in these countries increases FDI inflows by about 7%.

Table-3. Summary statistics for full sample

Variable	1	2	3	4
Constant	-26.64781 (13.16622)	-29.54376 (11.63846)	-31.26035 (28.47784)	-26.04266 (56.41564)
ln GDP (per capita)	1.589743 (.2278629)	1.493907 (.2120707)	1.399041 (.4027844)	2.057933 (.3349213)
ln Population	2.05909* (.8338123)	2.05909 * (.8338123)	2.671671* (1.245233)	2.133356** (1.069548)
Secondary Education (%)			.0071305 (.0189754)	.0222647 (.0286627)
Primary Education (%)			.0363249 (.0287645)	.0424391 (.0236449)
Tertiary Education (%)			.007631 (.0230848)	.0353848 (.0353848)
ln Life Expectancy		7.013335** (3.442996)	6.80563* (3.542008)	7.007931*** (4.002361)
ln Energy Production				2.674211 (.8166035)
Openness	.0115011* (.0065123)	.0111435* (.0042205)	.0115359** (.0061503)	.0012253*** (.0008654)
Govt. Effectiveness (Index)	.1795904 (.3221695)	.1005652 (.3225349)	.0059188 (.5400954)	.1044206 (.4397821)
Corruption Control (Index)	.0244007 (.2556771)	.1496988 (.272753)	.0573147 (.5299183)	.2984064 (.3748802)
Fixed Telephone lines				.0811251 (.4713022)

Note: Heteroskedastic-consistent (robust) standard errors are in parentheses.
* Significant at the 1% level.
** Significant at the 5% level.
*** Significant at the 10% level.
**** Significant at the 20% level.

The other components of human capital, education levels have positive coefficients, but are not statistically significant. However, in column 3 education of primary level is statistically significant at 26% but we still reject it. This finding is conflicting to our priori. We assumed that FDI investment is targeted to a people with particular education level. In this case, we conclude that education level may not be that much of a significant factor for FDI inflows to developing countries presently.

Looking at Bangladeshi sectors that enjoy FDI inflows, we see RMG, cosmetics, food and other industries depend largely on cheap labor who may not be educated. Working in RMG factory requires training, experience but education of workers is not considered. If we use this model for studying South East Asian and Latin American countries on regional or country-specific levels, then the estimates of education level coefficients may be significantly different from zero because effect of education on FDI is increasing over time. We hesitate to emphasize such a postulation due to lack of literature on this issue and lack of data. Another reason for the insignificant coefficients of education levels must be the measurement errors from the missing values, which is clearly seen in Table 1. The low-income countries in South Asia and Africa lack sufficient data for measuring the true impacts of education on any socio-economic variables.

We extend our model by adding energy production, openness and infrastructure that are also hypothesized to be determinants of FDI inflows. The results are reported in column (4) indicate that coefficient on life expectancy is significant (at 10% level) to these alternative specifications though energy production and infrastructure (fixed telephone lines per 100 people) do not themselves appear to be statistically significant. On the other hand, coefficient of openness appears statistically significant at 1% in column 1 and 2, at 5% in column 3 and at 10% in column 4. This is obvious, since FDI is directly related to trade barriers. Coefficients of energy production and infrastructure are found to be insignificant which conflicts our priori. The possible explanation may be being that infrastructural facilities and energy supply to plants are not the primary focus of FDI. However, separate studies on regions and countries could yield different results that claim the role of energy and infrastructure is significant.

6. CONCLUSION

This paper provides an empirical understanding that health is a positive and statistically significant factor for gross FDI inflows to developing countries. Our results remain consistent to alternative specifications of the model. The alternative specifications add governance and infrastructure variables along with openness. Population health, indicated by life expectancy has been proved to be the inherent factor behind the FDI inflow to developing countries. However, another determinant of FDI, education level, defied our hypothesis and turned out to be insignificantly related to FDI. Health and education constitute the basic human capital. Therefore, we cannot deny the impact education has on investment. Neither is our postulation wrong. We audaciously argue why, possibly, the effect of education level of FDI is not reflected in the estimation and results in the section of analysis. Future studies can confirm the effect of education level on FDI using sufficient data and other variables that is strongly tied to investment in developing countries. Yet our findings are consistent with the hypothesis that population health is an integral part of human capital in developing countries and improved population health is likely to cause a higher rate of FDI inflow.

Funding: This study received no specific financial support.
Competing Interests: The authors declare that they have no competing interests.
Contributors/Acknowledgement: Both authors contributed equally to the conception and design of the study.

REFERENCES

Alsan, M., D. Bloom and D. Canning, 2006. The effect of population health on foreign direct investment to low-income and middle-income countries. World Development, 34(4): 613–630. *View at Google Scholar | View at Publisher*

Asideu, E., 2002. On the determinants of foreign direct investment to developing countries: Is Africa different? World Development, 30(1): 107-119. *View at Google Scholar | View at Publisher*

Asideu, E., 2004. Policy reform and foreign direct investment in Africa: Absolute progress but relative decline. Development Policy Review, 22(1): 41-48. *View at Google Scholar | View at Publisher*

Blomstrom, M. and K. Kokko, 2003. Human capital and inward FDI. Working Paper No. 167, Centre for Economic and Policy Research, London.

Commission on Macroeconomics and Health (CMH), 2001. Retrieved from http://www1.worldbank.org/publicsector/pe/PEAMMarch2005/CMHReport.pdf.

Elsevier, 2004. Retrieved from http://www.who.int/trade/en/Smith_R_FDI_&_Trade_in_Health_Services_review_of_Literature_2004.pdf.

Grubaugh, S.G., 1987. Determinants of direct foreign investment. Review of Economics and Statistics, 69(1): 149-152. *View at Google Scholar*

Loungani, P. and A. Razin, 2001. How beneficial is foreign direct investment for developing countries? Finance and Development, 38(2): 6-9. *View at Google Scholar*

Lucas, R.E.J., 1990. Why doesn't capital flow from rich to poor countries? American Economic Review, 80(2): 92–96. *View at Google Scholar*

Miyamoto, K., 2003. Human capital formation and foreign direct investment in developing countries. Technical Paper No. 211, OECD, Paris.

Murray, C., A. Lopez, C.D. Mathers and C. Stein, 2000. The global burden of disease project: Aims, Methods & data sources. The global burden of disease in aging population. Research Paper No. 01.1. Harvard Burden of Disease Unit.

OECD, 1996. Retrieved from http://www.oecd.org/investment/investment-policy/2090148.pdf.

Shatz, H. and A.J. Venables, 2000. The geography of international investment. Policy Research Working Paper No. 2338. World Bank.

Smith, R.D., 2004. Foreign direct investment and trade in health services: A review of the literature. Social Science & Medicine, 59(11): 2313–2323. *View at Google Scholar | View at Publisher*

UNCTAD, 2003. Retrieved from http://unctad.org/en/docs/wir2003light_en.pdf.

WHO, 2001. Macroeconomic and health: Investing in health for economic development. Geneva.

World Bank, 2012. World development indicators online. Washington DC.

Appendix-I

School enrollment, tertiary (% gross)

Gross enrolment ratio. Tertiary (ISCED 5 and 6). Total is the total enrollment in tertiary education (ISCED 5 and 6), regardless of age, expressed as a percentage of the total population of the five-year age group following on from secondary school leaving. Source: World Development Indicators| Online

Energy production (kt of oil equivalent)

Energy production refers to forms of primary energy--petroleum (crude oil, natural gas liquids, and oil from nonconventional sources), natural gas, solid fuels (coal, lignite, and other derived fuels), and combustible renewables and waste--and primary electricity, all converted into oil equivalents. Source: World Development Indicators| Online

GDP per capita (current US$)

GDP per capita is gross domestic product divided by midyear population. GDP is the sum of gross value added by all resident producers in the economy plus any product taxes and minus any subsidies not included in the value

of the products. It is calculated without making deductions for depreciation of fabricated assets or for depletion and degradation of natural resources. Data are in current U.S. dollars. Source: World Development Indicators| Online

Telephone lines (per 100 people)

Telephone lines are fixed telephone lines that connect a subscriber's terminal equipment to the public switched telephone network and that have a port on a telephone exchange. Integrated services digital network channels and fixed wireless subscribers are included. Source: World Development Indicators| Online

Exports of goods and services (% of GDP)

Exports of goods and services represent the value of all goods and other market services provided to the rest of the world. They include the value of merchandise, freight, insurance, transport, travel, royalties, license fees, and other services, such as communication, construction, financial, information, business, personal, and government services. They exclude compensation of employees and investment income (formerly called factor services) and transfer payments. Source: World Development Indicators| Online

Imports of goods and services (% of GDP)

Imports of goods and services represent the value of all goods and other market services received from the rest of the world. They include the value of merchandise, freight, insurance, transport, travel, royalties, license fees, and other services, such as communication, construction, financial, information, business, personal, and government services. They exclude compensation of employees and investment income (formerly called factor services) and transfer payments. Source: World Development Indicators| Online

Primary completion rate, total (% of relevant age group)

Primary completion rate. Total is the total number of new entrants in the last grade of primary education, regardless of age, expressed as percentage of the total population of the theoretical entrance age to the last grade of primary. This indicator is also known as "gross intake rate to the last grade of primary." The ratio can exceed 100% due to over-aged and under-aged children who enter primary school late/early and/or repeat grades. Source: World Development Indicators| Online

School enrollment, secondary (% gross)

Gross enrolment ratio. Secondary. All programs. Total is the total enrollment in secondary education, regardless of age, expressed as a percentage of the population of official secondary education age. GER can exceed 100% due to the inclusion of over-aged and under-aged students because of early or late school entrance and grade repetition. Source: World Development Indicators| Online

Life expectancy at birth, total (years)

Life expectancy at birth indicates the number of years a newborn infant would live if prevailing patterns of mortality at the time of its birth were to stay the same throughout its life. Source: World Development Indicators| Online

(1) United Nations Population Division. World Population Prospects, (2) United Nations Statistical Division. Population and Vital Statistics Report (various years), (3) Census reports and other statistical publications from national statistical offices, (4) Eurostat: Demographic Statistics, (5) Secretariat of the Pacific Community: Statistics and Demography Programme, and (6) U.S. Census Bureau: International Database.

Population, total refers to the total population. Source: World Development Indicators| Online

Government Effectiveness and Corruption Control

The Worldwide Governance Indicators (WGI) are a research dataset summarizing the views on the quality of governance provided by a large number of enterprise, citizen and expert survey respondents in industrial and developing countries. These data are gathered from a number of survey institutes, think tanks, non-governmental organizations, international organizations, and private sector firms. The WGI do not reflect the official views of the World Bank, its Executive Directors, or the countries they represent. The WGI are not used by the World Bank Group to allocate resources.

Legend	
Estimate	Estimate of governance (ranges from approximately -2.5 (weak) to 2.5 (strong) governance performance)
StdErr	Standard error reflects variability around the point estimate of governance.
NumSrc	Number of data sources on which estimate is based
P-Rank	Percentile rank among all countries (ranges from 0 (lowest) to 100 (highest) rank)
Lower	Lower bound of 90% confidence interval for governance, in percentile rank terms
Upper	Upper bound of 90% confidence interval for governance, in percentile rank terms

Appendix-II.

List of Countries:

Algeria, Bangladesh, Bolivia, Brazil, Bulgaria, Burkina Faso, Cambodia, Cameroon, Chile, China, Colombia, Costa Rica, Dominican Republic, Ecuador, El Salvador, Ethiopia, Ghana, Guatemala, Guyana, Hungary, India, Jamaica, Jordan, Kenya, Madagascar, Malawi, Malaysia, Mali, Mexico, Morocco, Mozambique, Nicaragua, Niger, Panama, Paraguay, Peru, Philippines, Romania, Senegal, South Africa, Tanzania, Thailand, Tunisia, Turkey, Uganda, Uruguay.

Appendix-III.

The pair-wise correlation between the variables

	l_FDI	**l_GDP**	**l_tele**	**l_ener~p**	**l_pop**	**l_life**	**corrup~l**
l_FDI	1.0000						
l_GDP	0.6448	1.0000					
l_tele	0.6012	0.9081	1.0000				
l_energyp	0.5900	0.1236	0.1511	1.0000			
l_pop	0.4955	-0.1046	-0.0979	0.7966	1.0000		
l_life	0.5668	0.8156	0.8457	0.0440	-0.0685	1.0000	
corruption~l	0.5387	0.6372	0.6165	0.1348	0.0451	0.4712	1.0000
government~s	0.3292	0.5291	0.5361	0.0274	-0.1216	0.3896	0.7846
priedu	0.6375	0.8058	0.8219	0.2640	-0.0163	0.8031	0.5096
teredu	0.4008	0.6609	0.6252	-0.0204	-0.1932	0.5591	0.3585
secede	0.5761	0.8182	0.8641	0.1577	-0.0931	0.7713	0.5754
openness	-0.1222	0.0085	0.0445	-0.3535	-0.4560	0.0468	0.1004
	govern~s	primar~n	enroll~n	eudcat~y	openness		
government~s	1.0000						
priedu	0.3098	1.0000					
terede	0.3409	0.6716	1.0000				
secede	0.5158	0.8811	0.6664	1.0000			
openness	-0.0138	0.1159	0.1745	0.0459	1.0000		

Appendix-IV

Note: the rank of the differenced variance matrix (9) does not equal the number of coefficients being tested (11); be sure this is what you expect, or there may be problems computing the test. Examine the output of your estimators for anything unexpected and possibly consider scaling your variables so that the coefficients are on a similar scale

	---- Coefficients ----			
	(b fixed	(B) random	(b-B) Difference	sqrt(diag(V_b-V_B)) S.E.
gdp	3031464	2807267	224196.8	327721.3
totalpopul~n	311.5092	37.13932	274.3699	60.68422
lifeexpect~y	1.11e+09	1.77e+08	9.33e+08	7.87e+08
priedu	2.41e+08	1.30e+08	1.11e+08	6.90e+07
teredu	7.30e+07	9778087	8.28e+07	9.63e+07
government~s	4.36e+09	6.57e+09	2.21e+09	2.05e+09
corruption~l	1.56e+09	4.49e+08	1.11e+09	3.27e+09
telepjonef~s	8.19e+08	3.87e+08	4.32e+08	2.40e+08
secede	4.02e+07	5.69e+07	1.67e+07	1.17e+08
openness	7.13e+07	3.61e+07	3.52e+07	5.10e+07
_cons	4.23e+10	4.87e+09	3.75e+10	4.67e+10

b = consistent under Ho and Ha; obtained from xtreg
B = inconsistent under Ha, efficient under Ho; obtained from xtreg
Test: Ho: difference in coefficients not systematic chi2(9) = (b-B)'[(V_b-V_B)^(-1)](b-B)
= 64.21
Prob>chi2 = 0.0000
(V_b-V_B is not positive definite)

Appendix-V

Modified Wald test for groupwise heteroskedasticity in fixed effect regression model
H0: sigma(i)^2 = sigma^2 for all i
chi2 (41) = 1.5e+34
Prob>chi2 = 0.0000
Wooldridge test for autocorrelation in panel data
H0: no first-order autocorrelation
F(1, 30) = 4.338
Prob > F = 0.0459

Appendix-VI.

Regression 1

. xtreg l_FDI l_GDP l_pop openness governmenteffectiveness corruptioncontrol, fe vce(robust)

Fixed-effects (within) regression			Number of obs = 530			
Group variable: id			Number of groups = 45			
R-sq: within = 0.3372			Obs per group: min = 10			
between = 0.7798			avg = 11.8			
overall = 0.6793			max = 12			
corr(u_i, Xb) = -0.8280			F(5,44) = 24.14			
			Prob > F = 0.0000			
			(Std. Err. adjusted for 45 clusters in id)			
			Robust			
l_FDI	Coef.	Std. Err.	t	P>|t|	[95% Conf. Interval]	
l_GDP	1.589743	.2278629	6.98	0.000	1.130515	1.921307
l_pop	2.05909	.8338123	2.47	0.017	.3786513	2.87138
openness	.0115011	.0064123	1.79	0.080	.001422	.0236801
government~s	.1795904	.3221695	0.56	0.580	.0796996	.7505916
corruption~l	.0244007	.2556771	0.10	0.924	.5396839	.3999987
_cons	-26.64781	13.16622	-2.02	0.049	-53.18259	13.95224
sigma_u	1.6507303	1.6507303				
sigma_e	.78875496	.78875496				
rho	.81412428	.81412428	(fraction of variance due to u_i)			

Regression 2

. xtreg l_FDI l_GDP l_pop openness governmenteffectiveness corruptioncontrol l_life, fe vce(robust)						
Fixed-effects (within) regression			Number of obs = 530			
Group variable: id			Number of groups = 45			
R-sq: within = 0.3505			Obs per group: min = 10			
between = 0.6266			avg = 11.8			
overall = 0.5589			max = 12			
corr(u_i, Xb) = -0.6874			F(6,44) = 23.32			
			Prob > F = 0.0000			
			(Std. Err. adjusted for 45 clusters in id)			
			Robust			
l_FDI	Coef.	Std. Err.	t	P>|t|	[95% Conf. Interval]	
l_GDP	1.493907	.2120707	7.04	0.000	1.066506	1.921307
l_pop	2.059091	.8228123	2.50	0.001	2.006077	2.87138
openness	.0111435	.0042205	2.64	0.011	.0013931	.0236801
government~s	.1005652	.3225349	0.31	0.757	.0494612	.7505916
corruption~l	.1496988	.272753	0.55	0.586	.6993964	.3999987
l_life	7.013335	3.442996	2.04	0.048	.0744319	13.95224
_cons	-29.54376	11.63846	-2.54	0.015	-52.99953	-6.087991
sigma_u	1.6276028					
sigma_e	.78158868					
rho	.8126116	(fraction of variance due to u_i)				

Regression-3

Fixed-effects (within) regression			Number of obs = 251			
Group variable: id			Number of groups = 41			
R-sq: within = 0.4480			Obs per group: min = 1			
between = 0.0762			avg = 6.1			
overall = 0.0605			max = 12			
			F(9,40) = 30.36			
corr(u_i, Xb) = -0.9246			Prob > F = 0.0000			
			(Std. Err. adjusted for 41 clusters in id)			
Robust						
l_FDI	Coef.	Std. Err.	t	P>|t|	[95% Conf. Interval]	
l_GDP	1.399041	.4027844	3.47	0.001	.5849828	2.213098
l_pop	2.671671	1.245233	2.14	0.023	2.25161	2.908266
openness	.0115359	.0061503	1.87	0.066	.0069576	.0300293
government~s	.0059188	.5400954	0.01	0.991	.000492	1.085655
corruption~l	.0573147	.5299183	0.11	0.914	1.01369	1.12832
l_life	6.805631	3.542008	1.97	0.054	5.0352	7.64646
priedu	.0363249	.0287645	1.26	0.214	.0218103	.09446
teredu	.007631	.0230848	0.33	0.743	.0542872	.0390252
secedu	.0071305	.0189754	0.38	0.709	.0454813	.0312202
_cons	-31.26035	28.47784	-1.10	0.279	-88.81621	26.2955
sigma_u	5.2144314					
sigma_e	.78406156					
rho	.97789061	(fraction of variance due to u_i)				

Regression-4

Fixed-effects (within) regression			Number of obs = 217			
Group variable: id			Number of groups = 35			
R-sq: within = 0.5402			Obs per group: min = 1			
between = 0.0369			avg = 6.2			
overall = 0.0091			max = 12			
			F(9,40) = 39.08			
corr(u_i, Xb) = -0.9184			Prob > F = 0.0000			
			(Std. Err. adjusted for 41 clusters in id)			
		Robust				
l_FDI	Coef.	Std. Err.	t	P>|t|	[95% Conf. Interval]	
l_GDP	2.057933	.3349213	6.14	0.000	1.377291	2.738575
l_pop	7.007931	4.002361	1.75	0.105	6.040186	7.98069
secedu	.0222647	.0286627	0.78	0.443	.0805143	.0359849
priedu	.0424391	.0236449	1.79	0.082	.0056131	.0904914
teredu	.0353848	.024409	1.45	0.156	.0849899	.0142203
lifeexpect~y	.2793147	.2347455	1.19	0.242	.1977456	.756375
l_energyp	2.674211	.8166035	3.27	0.002	1.014673	4.333749
openness	.0012253	.0008654	0.41	0.877	.014759	.0172096
government~s	.1044206	.4397821	0.24	0.814	.9981654	.7893242
corruption~l	.2984064	.3748802	0.80	0.432	.4634419	1.060255
l_tele	.0811251	.4713022	0.17	0.864	1.038927	.8766763
_cons	-26.04266	56.41564	-0.46	0.647	-140.693	88.60772
sigma_u	4.6433806					
sigma_e	.73661624					
rho	.97545179	(fraction of variance due to u_i)				